UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/601,310	07/31/2000	Sang-young Lee	202021/140	9736

7590 02/10/2003

Georgia Caton
Nixon Peabody LLP
P O Box 31051
Clinton Square
Rochester, NY 14603

EXAMINER	
BERMAN, SUSAN W	

ART UNIT	PAPER NUMBER
1711	13

DATE MAILED: 02/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/601,310	LEE ET AL.	
	Examiner	Art Unit	
	Susan W Berman	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8,15,17 and 19-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8,15,17 and 19-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Amendment

The amendment filed 11-29-2002 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the specification discloses "energized ionic particles", not "energized cationic particles", as now recited in claim 15, 17, 19, 20, 22 and 31.

Applicant is required to cancel the new matter in the reply to this Office Action.

The rejections of claims 3, 20 and 23 are rejected under 35 U.S.C. 112, second paragraph, are withdrawn in response to Amendment B, filed 11-29-2002. Claim 3 has been canceled and claims 20 and 23 have been amended. The rejections of claims 1-6 and 9 are moot because these claims have been canceled by Amendment B.

The rejection of claims as being anticipated by Urairi et al (5,282,965) is withdrawn in response to amended claims 15 and 31. It is agreed that Urairi et al do not teach sequential treatment by irradiation with ionic particles followed by infusing a reactive gas onto the surface of the irradiated polymer. Applicant also argues that Urairi et al teach irradiation with a plasma that contains electrons as well as positive ions and therefore, differs from the instantly claimed irradiation with "energized (cat)ionic particles". This argument is not persuasive because Urairi et al disclose a plasma treatment that would consist of irradiation of the polymer surface with free electrons and positive ions. The comprising language of the instant claims does not exclude irradiation with electrons in addition to irradiation with ionic particles, as occuring in the disclosed plasma treatment.

The rejection of claims as being anticipated by Machi et al (4,376,794) is withdrawn in response to amended claims 15 and 31 for the same reasons set forth above with respect to Urairi et al.

Response to Arguments

Applicant argues that the plasma treatment disclosed by Ohnishi differs from irradiation with energized cationic particles. Applicant proposes limiting the energized ionic particles to cationic particles in the amended claims, however, this generates an issue of new matter, as set forth above. Applicant could set forth the specific particles recited in claim 20 as an alternative to reciting "energetic cationic particles" to avoid the new matter rejection. However, it is suggested that the phrase "energized ionic particle" is sufficient to set forth ions and not electrons. An ion is defined, as is well known in the art, as an atom or radical that has lost or gained one or more electrons, thus acquiring an electrical charge. An electron is defined, as is well known in the art, as a constituent of an atom or a free particle having a negative charge, therefore, electrons are not considered to be "energized ionic particles". However, the comprising language of the instantly claimed method does not exclude irradiation with electrons in addition to irradiation with energized ionic particles, as occurs in a plasma treatment. The difference between the disclosure of Ohnishi and the instant invention appears to be the kinds of gaseous monomers taught by Ohnishi for graft polymerization onto the treated polymer surface, as well as the plasma treatment that is not excluded by the instant claim language. Applicant alleges that the use of plasma leads to problems, however, this argument is unpersuasive because there is no comparative evidence of record to show that plasma treatment is significantly different from treatment with energized ionic particles alone and because the claim language does not exclude the electrons present in a plasma treatment. Irradiation with plasma encompasses irradiation with cationic ionic particles, as discussed above.

Applicant's arguments with respect to the rejection of claims over Masuoka are unpersuasive for the same reasons set forth in the above discussion. See Example 1 for disclosure of sequential irradiation with plasma and introduction of gaseous monomer for grafting.

Applicant argues that the cited Korean publication, Jung et al and Koh et al teach simultaneous treatment with ionic radiation and reactive gas infusion while the amended claims recite that "the cationic beam irradiation of step (a) and the reactive gas infusion of step (b) are sequentially made". In response the rejection of claims over each of the primary references in view of Machi et al are withdrawn. It is agreed that Machi et la do not suggest sequential steps. New grounds of rejection are set forth below.

The rejections of record of claim 8 are maintained. Lazear is cited merely to show that the recited method manufacturing a microporous film are known in the art.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 20, electrons are included in the group of ion generating gases; however, electrons are not gases and do not produce ions. Electrons are charged particles but they are not ionic particles. Ionic particles are electrically charged atoms, radicals or molecules. Alternatively, applicant could replace "ionic particles" with "electrically charged particles". See the discussion of IBEST and EBEST in the Stinnett et al references. Claim 23 recites "high vacuum of step (b)" in claim 15, however, claim 15 recites "high vacuum" in step (a), not in step (b).

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 15, 17, 19, 20, 23, 24 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohnishi (5,028,332). Ohnishi discloses forming a hydrophilic material by subjecting the surfaces of a polymer to a plasma treatment. The Examples teach plasma treatment at an argon pressure such as 0.1 torr in order to provide radicals on the surface of the polymer, reducing the pressure to 0.01 torr or below and then graft polymerizing a hydrophilic monomer supplied in the gas phase to the plasma treated polymer. Ohnishi teaches irradiation by plasma treatment in a vacuum, such as 0.1 torr that is then reduced to 0.01 torr or below, which method appears to provide the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film.

Claims 15, 17, 19, 20, 23, 24, 27 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Masuoka et al (4,845,132). Masuoka et al disclose production of a hydrophilic porous membrane by irradiating a hydrophobic porous membrane with plasma and then introducing a hydrophilic monomer in gaseous state to undergo a grafting reaction (see example 1). Plasma irradiation takes place under a vacuum, within the range of 10^{-3} to 10 torr (column 7, lines5-10). The graft polymerization is carried out under pressure in the range from 10^{-2} to 10^{4} Torrs. See column 6, lines 37-42, and column 6, line 58, to column 8, line 23, and the examples.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 15, 17, 19-25 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuoka et al (4,845,132). Masuoka et al disclose production of a hydrophilic porous membrane by irradiating a hydrophobic porous membrane with plasma in the presence of a hydrophilic monomer in gaseous state. Plasma irradiation takes place under a vacuum, for example at 0.1 Torr of argon gas (Examples). The graft polymerization is carried out under pressure in the range from 10^{-2} to 10^{4} Torrs. See column 6, lines 37-42, column 6, line 58, to column 8, line 23.

With respect to claims 21 and 22, It would have been obvious to one skilled in the art to determine the energy and dose of ion particles required to obtain the desired product from the teachings of Masuoka et al. With respect to claim 25, It would have been obvious to one skilled in the art to determine the rate of infusion of gas required to obtain the desired energy and dose of ion particles and the desired product in the method disclosed by Masuoka et al. With respect to claim 28, It would have been obvious to one skilled in the art to treat a blend of polyolefins since Masuoka et al teach that different kinds of polyolefins can be treated by the disclosed method.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masuoka et al (4,845,132) in view of Lazear (4,346,142). The disclosure of Masuoka et al are discussed above. Masuoka et al disclose treating polyolefins starting with a porous membrane having pore diameters in the range from 0.05 micrometers to 1 micrometers. However, Masuoka et al do not mention the method of manufacturing the porous polyolefin membrane to be treated.

Lazear discloses a microporous polyolefinic film prepared by cold and/or hot stretching or by wet stretching that is then rendered hydrophilic by exposing the surface to about 1 to about 10 megarads of ionizing radiation. It would have been obvious to one skilled in the art to employ a microporous film prepared by hot and/or hot stretching or by wet stretching, as taught by Lazear for use in an analogous

method of providing a hydrophilic surface, in the method for producing a hydrophilic porous membrane disclosed by Masuoka et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success because Masuoka et la teach starting with a porous membrane having pore diameters in the range from 0.05 micrometers to 1 micrometers and Lazear teaches providing an average pore size from about 200 to about 10000 Angstroms, thus providing the desired pore size fro the process of Masuoka et al as well.

Claims 15, 17, 19-26 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korean Laid-Open Patent Publication No. 96-37742, as discussed on page 4 of the specification, in view of Ohnishi (5,028,332) or Masuoka et al. (4,845,132).

Korean Publication No. 96-37742 discloses a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See page 4, lines 5-14. Each of Ohnishi and Masuoka et al disclose a process for making the surface of a porous polymeric hydrophilic by irradiating the polymer surface with a plasma (ionic particles and electrons) under vacuum and then contacting the polymer surface with a gaseous monomer . See the rejections under 35 USC 102 set forth above.

The discussion of Korean Laid-Open Patent Publication No. 96-37742 in the instant specification does not specifically mention treating polymer membranes, polyolefin blends or laminates. However, each of Ohnishi and Masuoka et al teach that a porous polyolefin polymeric membrane can be treated with ionizing radiation and thereafter grafted with a gaseous monomer to provide a hydrophilic surface. It would have been obvious to one skilled in the art to employ polymers in the form of porous polymeric membranes, as taught by Ohnishi or Masuoka et al in an analogous process, as the polymer to be treated in the process disclosed by Korean Publication '742. One of ordinary skill in the art at the time of the

invention would have been motivated by a reasonable expectation of success in providing a useful hydrophilic polymeric membrane having a decreased wetting angle. It would further have been obvious to one skilled in the art at the time of the invention to treat the irradiated polymeric surface with a gaseous monomer after irradiation (sequentially), as taught by Ohnishi or by Masuoka et al in analogous methods, instead of simultaneously, as disclosed by Publication No. 96-37742 according to the instant specification. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of providing a useful polymer product having a hydrophilic surface corresponding to the hydrophilic polymer surface formed by simultaneous irradiation and contact with a reactive gas. Ohnishi provides motivation by teaching that the disclosed method is an efficient surface treatment for grafting without a polymerization initiator or catalyst. Masuoka et la provided motivation by teaching the mechanism of graft polymerization by forming active seeds by plasma treatment to set the graft polymerization proceeding (column 7, line 39, to column 8, line 5).

Claims 15, 17, 19-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung et al (5,965,629) in view of Ohnishi or Masuoka et al. Jung et al disclose a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See column 4, line 39, to column 7, line 49, and Examples 1-3. Jung et al teach that irradiating ion particles onto the polymer surface changes the topography of the surface.

Jung et al do not specifically mention treating polymer membranes, polyolefin blends or laminates. However, each of Ohnishi and Masuoka et al teach that a porous polyolefin polymeric membrane can be treated with ionizing radiation and thereafter grafted with a gaseous monomer to provide a hydrophilic surface. It would have been obvious to one skilled in the art to employ polymers in the form of porous polymeric membranes, as taught by Ohnishi or Masuoka et al in an analogous process,

as the polymer to be treated in the process disclosed by Jung et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success in providing a useful hydrophilic polymeric membrane having a decreased wetting angle. It would further have been obvious to one skilled in the art at the time of the invention to treat the irradiated polymeric surface with a gaseous monomer after irradiation (sequentially), as taught by Ohnishi or by Masuoka et al in analogous methods, instead of simultaneously, as disclosed by Jung et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of providing a useful polymer product having a hydrophilic surface corresponding to the hydrophilic polymer surface formed by simultaneous irradiation and contact with a reactive gas. Ohnishi provides motivation by teaching that the disclosed method is an efficient surface treatment for grafting without a polymerization initiator or catalyst. Masuoka et la provided motivation by teaching the mechanism of graft polymerization by forming active seeds by plasma treatment to set the graft polymerization proceeding (column 7, line 39, to column 8, line 5).

Claims 15, 17, 19-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koh et al (5,783,641) in view of Ohnishi or Masuako et al. Koh et al disclose a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See column 4, line 19, to column 7, line 50, and Examples. Koh et al teach that irradiating ion particles onto the polymer surface changes the topography of the surface.

Koh et al do not specifically mention treating polymer membranes, polyolefin blends or laminates. However, each of Ohnishi and Masuoka et al teach that a porous polyolefin polymeric membrane can be treated with ionizing radiation and thereafter grafted with a gaseous monomer to provide a hydrophilic surface. It would have been obvious to one skilled in the art to employ polymers in

the form of porous polymeric membranes, as taught by Ohnishi or Masuoka et al in an analogous process, as the polymer to be treated in the process disclosed by Koh et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success in providing a useful hydrophilic polymeric membrane having a decreased wetting angle. It would further have been obvious to one skilled in the art at the time of the invention to treat the irradiated polymeric surface with a gaseous monomer after irradiation (sequentially), as taught by Ohnishi or by Masuoka et al in analogous methods, instead of simultaneously, as disclosed by Koh et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of providing a useful polymer product having a hydrophilic surface corresponding to the hydrophilic polymer surface formed by simultaneous irradiation and contact with a reactive gas. Ohnishi provides motivation by teaching that the disclosed method is an efficient surface treatment for grafting without a polymerization initiator or catalyst. Masuoka et la provided motivation by teaching the mechanism of graft polymerization by forming active seeds by plasma treatment to set the graft polymerization proceeding (column 7, line 39, to column 8, line 5).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korean Laid-Open Patent Publication No. 96-37742, as discussed on page 4 of the specification, Jung et al (5,965,629) or Koh et al (5,783,641), each in view of Ohnishi or Masuoka et al, as appplied to claim 15 above, and further in view of Lazear (4,346,142). None of the primary nor secondary references mention the method of manufacturing the porous membrane to be treated.

Lazear discloses a microporous polyolefinic film prepared by cold and/or hot stretching or by wet stretching that is then rendered hydrophilic by exposing the surface to about 1 to about 10 megarads of ionizing radiation. It would have been obvious to one skilled in the art to employ a microporous film prepared by hot and/or hot stretching or by wet stretching, as taught by Lazear for use in an analogous

method, in the method for producing a hydrophilic porous membrane disclosed by Publication 96-37742, Jung et la or Koh et al, each in combination with Ohnishi or Masuoka et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of successfully providing a porous polymeric membrane to be modified because Ohnishi teaches starting with a porous membrane and Masuoka et al teach starting with a porous membrane having pore diameters in the range from 0.05 micrometers to 1 micrometers. Lazear teaches an average pore size from about 200 to about 10000 Angstroms thus providing the desired pore size for the process of Publication 96-377742, Jung et al or Koh et al in combination with Ohnishi or Masuoka et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan W Berman whose telephone number is 703 308 0040. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 703 308 2462. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

Susan Berman

Susan W Berman
Primary Examiner
Art Unit 1711

SB
February 7, 2003